#3671

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

KAREL VAN DEN BERG

Group Art Unit: 3671

Examiner: V. Batson

Serial No.: 09/764,292

Filed: January 19, 2001

For: AN UNMANNED VEHICLE FOR DISPLACING MANURE

Docket No.: 8553/206

INFORMATION DISCLOSURE STATEMENT

To the Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Information Disclosure Statement which lists prior art that may be considered of interest in the examination of subject Application.

This Information Disclosure Statement should not be construed as a representation that an exhaustive search of the prior art has been conducted or that other material information as defined under 37 CFR §1.56(a) may not exist.

It is submitted, however, that this statement complies with the requirements of 37 CFR §1.56, §1.97 and §1.98 and the Manual of Patent Examining Procedure, Section 609. If, for any reason, the Examiner to whom this Application is assigned for examination considers otherwise, it is respectfully requested that the undersigned be contacted so that any deficiencies can be corrected.

03/14/2005 JBALINAN 00000109 09764292 180.00 OP
01 FC:1806

The following search report and documents are submitted herewith:

1. U.S. Patent No. 2,966,256, to McLeland, issued December 27, 1960. This patent is directed to a barn-gutter cleaner. It discloses a scoop means that enters a barn-gutter and automatically and repeatedly loads itself and carries the load to the end of the gutter which is thereby substantially entirely cleaned. Thereafter the tractor reverses and pulls the loaded scoop up the inclined elevator 20 to discharge the collected manure therefrom.

2. U.S. Patent No. 4,751,658 was issued June 14, 1998 to Kadonoff et al. The patent discloses a mobile robot and relates to a system for avoiding obstacles in the path of such mobile robot. Attention is invited, in particular, to Figure 19 which discloses a local navigation 520. Figure 19 is a schematic block diagram of the interrelationship between a map, global navigation and local navigation. Also attention is invited to Figure 2, wherein an inclinometer 197 is utilized to correct for unevenness in the terrain. Navigation of the robot utilizes successive nodes as shown in map 338, Figure 7A. Path 342 designates consecutive navigation nodes and paths between such nodes. At each node, the robot changes its heading, recalibrates its estimated position, and heads towards the next node. During recalibration, the inclinometer 197 is read until motion in the robot settles. Once stable, the final inclination reading is taken and the vertical inclination of the robot is adjusted. A position estimation system 339 ensures that the robot is properly positioned and oriented. The navigation system 520 guides the robot along a path toward a destination while avoiding obstacles in the path. The navigation system's output varies continuously. The robot can accept new commands during execution of turns and changes the velocity as directed by an arbiter to provide for smoother turning and acceleration changes of the robot. The hierarchy of operational commands for the robot are shown in Figure 19. The global navigation system 670 includes a planner 672 and executive 674. Planner 672 is

responsive to a map 676 which contains the expected estimation data. Map 676 can be generated by an operator who escorts the robot from node to node.

3. U.S. Patent No. 4,815,008, issued March 21, 1989, to Kadonoff et al. It features a mobile robot having an azimuthal angle optionally fixed in space. "Azimuth" is a term used in navigation and surveying. In general it is the horizontal angular distance from a reference point, usually the northern point of the horizon measured clockwise through 360°. This provides the robot disclosed in the patent a basic reference to the outside world. The robot may include means for initially supplying the azimuthal angle to means for storing and means for rotating its head with respect to its body by the angular deviation. The robot thus utilizes the azimuthal angle as a reference to the outside world. The azimuthal orientation of body 14, Figure 4A, is represented by a point 302 referred to in the disclosure as "sensor zero." This is used to calculate the azimuthal distance. It represents the robot's orientation with a surrounding environment. As in the above patent to Kadonoff et al, an inclinometer 197 is utilized to correct for unevenness in the terrain. As before, there are a plurality of nodes and paths between the nodes which the robot follows. Also as above, when the robot is in a fixed position an inclinometer is read until the robot's motion settles and then a final inclination reading is utilized to correct the orientation of the robot relative to the beacon involved.

4. U.S. Patent No. 5,109,566, which issued May 5, 1992, to Kobayashi et al, is directed to an unmanned floor cleaner. A rate gyro is used as a direction sensor 26 for detecting the direction of the main body 1. The distance of travel and movement direction of the cleaner are detected on the basis of a revolution speed detected by the rotary encoder 24 and the moving direction detected by direction sensor 26. The cleaner includes a rotating brush driven by motor

6 which is provided with a suction nozzle 5. Two batteries 36 are disposed over drive part 17 so that the weight of the batteries 36 is applied primarily to driving wheels 15 and 16.

5. U.S. Patent No. 5,444,893, to Hwang et al, issued August 29, 1995. This patent is for a method and apparatus for preventing bumping and falling of an automatic traveling cleaner wherein an impending bumping or falling is sensed by a variation of the flow rate of a fluid in an extension pipe extending along a gap between an intake port and a surface to be cleaned. The invention, it is stated, eliminates the provision of a plurality of sensors densely arranged around a cleaner and adapted to sense bumping and falling of the cleaner and thus also reduces the manufacturing cost.

6. U.S. Patent No. 5,581,034, to Dao et al, was issued December 3, 1996. It is directed to a convective accelerometer and inclinometer. An inclinometer (also called an clinometer) is an instrument for measuring angles of elevation, slope or incline. Particular attention is invited to the description of related art under the Background of the Invention in columns 1 and 2 of the patent. Here various types of accelerometers are discussed. An accelerometer senses or measures acceleration, but also may measure velocity, position or inclination. Two or more accelerometers may be used in combination more precisely to measure angular acceleration or angular velocity. The accelerometer of the patent includes two temperature sensing elements mounted within a shield enclosure containing a gas which is preferably an inert gas such as nitrogen, argon, xenon, neon or krypton or mixtures thereof. It is stated that velocity and position can be calculated mathematically from the acceleration or inclination data outputted by the invention disclosed in the patent. It is also stated that the described accelerometer can be made small enough for use in a wide variety of applications including navigation.

7. U.S. Patent No. 5,808,197, to Dao, which issued September 15, 1998, is a continuation-in-part of the above patent. Commencing on line 64 of column 2 and extending to line 9 in column 4, various types of accelerometers are discussed together with U.S. patent numbers wherein they may be found. The last step of Claim 10 is "controlling a vehicle control or sensing system in accordance with the determined acceleration or inclination" in a method of controlling a vehicle.

8. International Publication No. WO97/31524, published September 4, 1997, of van der Lely, discloses a shed for animals, such as cows, having cleaning means capable of being moved through the shed for cleaning its floor. As seen in Figure 2, detection means 40 comprise a sensor 41 by means of which obstacles in the vicinity of the robot arm construction 16 can be detected. Sensor 41 detects excrements on floor 17 whereby the robot arm construction 16 is capable of cleaning very selectively the shed floor 15.

9. European Patent Application Publication No. 0 142 594 A1, to Okumura, was published May 29, 1985. It is directed to a control system for a mobile robot. It discloses in Figure 1 a distance sensor for producing a pulse signal which is proportional to a distance traveled by the mobile robot such as calculated by the number of rotations of drive wheels. A direction sensor 2 such as a gas rate gyro is sensitive to a change in the traveling direction of the robot. Signals from distance sensor 1 and direction sensor 2 are supplied to a position identification means 3. Obstruction sensors 4 are on the front, opposite sides and back of the robot. Touch sensors 5 are also mounted on the robot which locate obstructions by mechanical contact therewith independently of obstruction sensors 4. Claim 1 on page 16 is directed to a control system for a mobile robot which includes position identification means for sensing a distance traveled by the robot and a change of direction of travel of the robot. This position of

the robot is calculated in two-dimensional coordinates in response to the sensed direction and a sense change in direction.

10. European Patent Application Publication No. 0 402 764 A2, of Mizuno et al, was published December 19, 1990. A detecting unit comprises a direction sensor 16a which is comprised of a gyro-device to output attitude angle information for an attitude control of the running unit 14. An isometric view of the cleaning unit is shown in Figure 1. There is a steering unit 15, a detecting unit 16 as indicated above, and a cleaning unit 13. Cleaning unit 13 comprises a cleaning tool 13a, a cleaning liquid supply 13b for supplying a cleaning liquid required for cleaning, and a collection unit 13c for collecting filth produced as the result of the cleaning. It is stated that drift of direction sensor 16a can be corrected in accordance with the second embodiment.

11. European Patent Application No. EP 0 943 235 A2, of van der Ploeg, was published March 16, 1999. This EP Application discloses an apparatus 1 having a forwardly disclosed cleaning slide 2. It is stated that vehicle 1 comprises laser means or infrared means or radio graphical means among which GPS and induction means are included.

12. Auslegeschrift No. 1109 441, dated June 22, 1961, of Weinmann. This document is in German but, from the figures appears to involve a component 1 supported by wheels 3 which are biased to contact the sides of a depression or if there is no depression are perpendicular thereto. The undersigned is not familiar with German and, accordingly, if a translation of this document is desired, it will be obtained at the request of the Patent Examiner. However, the apparatus disclosed appears to be similar to the barn-gutter cleaner of McLeland discussed in item No. 1 above.

13. Auslegeschrift No. 1183 301, dated December 10, 1964, of Josef Breuer. This Auslegeschrift appears to be directed to a "Dungschieber." It is the impression of the undersigned that similar to the above Auslegeschrift a device is disclosed wherein a "Dungschaufel 3a" is pushed or pulled along a channel wherein the wheels 12 and 19 bear against the sides of the channel. Again, if a translation of this German Auslegeschrift is desired, it will be provided upon request by the Patent Examiner. As stated above, the apparatus seems similar to McLeland's barn-gutter cleaner discussed in item No. 1 above.

14. Offenlegungsschrift No. DE 44 25 924 A1, dated January 25, 1996, is directed to what appears to be a wagon or trailer having what also appears to be a robotic arm or the like. Again, if a translation of this German Offenlegungsschrift is desired, it will be provided on the request of the Patent Examiner.

15. UK Patent Application No. GB 2,313,191 A, of Tae-Sig Kim, for a robot cleaner direction sensor. This UK Patent Application discloses a turning direction sensor 38 having a magnetic needle 72 in a hermetic container 68. There is a reflective disc 76 attached to the magnetic needle 72 and rotatably supported by a pin 70 which is attached to a plurality of triangular reflective mirrors 74 in a circular shape. As the direction of the vehicle changes, the disc rotates relative to an emitting/sensing means 82 and the output of the sensor means varies gradually and cyclically allowing the magnitude and direction of rotation to be determined. There can be 360 reflective mirrors, one for each degree or 36 reflective mirrors, one for each 10 degrees. Attention is invited to Claim 1 of this UK Patent Application. The Application discloses a combined ultrasonic and optical navigation system.

16. Wikipedia, the free encyclopedia: Inertial Guidance System. Although last modified February 20, 2005, it sets forth prior art via the use of accelerometers in inertial guidance

systems for unmanned vehicles. It may be helpful insofar as it provides information concerning various types of accelerometers as were listed in above references such as the patents to Dao (et al).

17. Article: Inertial and Guidance, published in the Illustrated Science and Invention Encyclopedia: How It Works, last copyright listed: 1983. This article is included in this Information Disclosure Statement largely because the figure on the third page illustrates the utilization of three inclinometers, one disposed east-west, another disposed north-south, and the third disposed vertically, supported on a gyroscope. These inclinometers are used for guidance of position and distance traveled by an unmanned vehicle. The figures on the third page are similar to those often seen in prior art literature.

Pursuant to Fee Code 1806, our check in the amount of $180.00 is provided herewith for the submission of an Information Disclosure Statement. If incorrect, the Commissioner of Patents and Trademarks is authorized to credit or debit our Account No. 13-2000, as appropriate.

Respectfully submitted,

MASON, MASON & ALBRIGHT

By _____
Penrose Lucas Albright
Registration No. 19,082

2306 South Eads Street
P.O. Box 2246
Arlington, VA 22202
Tel (703) 979-3242
Fax (703) 979-2526

Filed: March 11, 2005

INFORMATION DISCLOSURE STATEMENT BASED ON FORM PTO-1449	ATTY. DOCKET NO. 8553/206	SERIAL NO. 09/764,292
LIST OF PRIOR ART CITED BY APPLICANT *(Use several sheets if necessary)*	APPLICANT: KAREL VAN DEN BERG	
	FILING DATE: 01/19/01	GROUP: 3671

OTPE JC1 MAR 1 1 2005 PATENT & TRADEMARK OFFICE

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT	DATE	NAME	CLASS/	FILING DATE (IF APPROPRIATE)
	AA	4,751,658	06/14/88	Kadonoff et al	364/513	
	AB	4,815,008	03/21/89	Kadonoff et al	364/513	
	AC	2,966,256	12/27/60	McLeland	198/224	
	AD	5,109,566	05/05/92	Kobayashi et al	15/319	
	AE	5,444,893	08/29/95	Hwang et al	15/319	
	AF	5,581,034	12/03/96	Dao et al	73/514.09	
	AG	5,808,197	09/15/98	Dao	73/514.09	
	AH					
	AI					
	AJ					
	AK					

FOREIGN PATENT DOCUMENTS

		DOCUMENT	DATE	COUNTRY	CLASS/	TRANSLATION	
						YES	NO
	AL	WO97/31525	09/04/97	PCT-International			
	AM	EPO 0142594A1	05/29/85	Europe			
	AN	EPO 0402764A2	12/19/90	Europe			
	AO	EPO 0943235A2	03/16/99	Europe			
	AP	1109441	06/22/61	Germany			X
	AQ	1183301	12/10/64	Germany			X
	AR	DE 4425924A1	01/25/96	Germany			X

OTHER PRIOR ART (*Including Author, Title, Date, Pertinent Pages, etc.*)

	A		**Wikipedia, The Free Encyclopedia: Inertial Guidance System (Internet: 02/20/05)**
	AR		**The Illustrated Science and Invention Encyclopedia: How It Works, Vol. 10, Inertial Guidance**
			pp 1258-61 (1983)
	AS		

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.